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The vehicle:

**Ford Mondeo
2.0 TDCi**

The symptoms:

The engine is running erratically, resulting in low power and poor emissions.

The fault:

The Common Rail injectors show the following fault codes:

F2336 Injector 1 fault

F2337 Injector 2 fault

F2338 Injector 3 fault

F2339 Injector 4 fault

The fault is accompanied with a descriptor **"Accelerometer out of range"**. This typically means that the tolerance window of 80 micro seconds has been exceeded and therefore the system cannot modify the drive to the injector to maintain stability.

If the fault code is accompanied by a rail pressure fault code it is likely that the whole system has been contaminated. In all cases a hydraulic diagnostic check, using the Delphi Sealed Rail Kit, should confirm which parts are at fault.

A step-by-step guide to diagnosing Common Rail injector faults on Ford Mondeo

The resolution:

The fault codes should first be confirmed, and if the code is one or all of those to the left, the following procedure is recommended:

Step 1: Remove the fuel filter and empty the contents into a clean container.

If the content is not clear, full of particulates, or has high water content, then the system must be cleaned out from the tank to the filter.

If the sample is clear and the amount of particulates in the sample covers less than one square centimetre then proceed to the hydraulic test. More than one square centimetre suggests heavy contamination, and if the particles are of a metallic nature, a full system overhaul will be required.

Tip! Ferrous metallic particles can be identified by using a magnet under the base of the container.

At this stage it is also advised to check for damage to the other mechanical components in the system using a hydraulic or "wet side" diagnostic on the pump, injectors and rail. A biodiesel check can be performed using Delphi's fuel analyser to confirm if the sample meets European EN590 fuel standard.

Step 2: Hydraulically test the pump and injectors for max pressure and backleakage using the Delphi Sealed Rail Diagnostic Kit.

If the pump pressure is lower than the recommended spec stated in the kit instructions, this indicates that the pump is worn and requires attention. Further testing with the False Actuator Kit will determine whether the damage is internal or to the external IMV.

Note: Any contamination in the high pressure pump will also be in the rail and injectors and will result in a system replacement.

If the pressure can be recovered by a new IMV proceed to the next step. The injector backleakage is critical and must be within the parameters outlined in the test kit manual. If the backleakage is not uniform between the cylinders then the highest backleak injectors should be serviced in accordance with Delphi service standards, or replaced with new injectors.

Note: The high backleak injectors should align with the fault codes present for the relevant injector number. If all of the injectors have high backleakage this is probably due to fuel contamination and will indicate further intervention is required and that all of the injectors require service.

Note: If contamination is present in the system, changing injectors alone will run a high risk of repeat failure, thus increasing the cost of repair to the customer.

Step 3: Replace the fuel filter

When replacing the filter ensure a genuine Delphi or Ford part is used. The filter screen is 2 microns which is necessary for system protection. Non-genuine filters may have a larger filter screen, typically 5 to 10 microns – this is inadequate for this application.

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Step 4: Ensure the correct torque setting

Ensure all pipes are tightened to the correct torque setting to prevent distortion of the pipe and/or injector and that the injector mountings are also torqued in accordance with the specification.

Step 5: Re-programme the ECU

Every Delphi Common Rail injector, be it new or repaired, should have a label with a characterisation code applied to it. It is essential that the ECU is re-programmed with this code when the injector is fitted to the vehicle. This will ensure that the adjustment to the pulse times is made and that the correct fuel delivery is maintained.

Step 6: Final check

And finally, clear all fault codes, road test the vehicle and recheck for codes after the road test.

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